



Learning Aims and Curriculum Intent:

- To introduce the concepts of Computer Hardware, Computer Software and Data Representation
- To introduce the concept of artificial intelligence and common machine learning paradigms
- To introduce and develop fundamental programming skills using the Python programming language.

Term	Content, Key Questions and Knowledge	Skills	Assessment
Michaelmas 1 / Lent 2	<p>Computer Systems / Data Representation</p> <p>What a computer system is...</p> <p>The key hardware components of a computer system</p> <p>The types of software that can be run using a computer system.</p> <p>Why binary is used to represent data in a computing context.</p> <p>How binary can be represented using different media (magnetic, optical, solid state)</p> <p>How to convert between binary and denary numbers</p> <p>How to calculate file sizes using standard denary prefixes</p>	<ul style="list-style-type: none"> • Recall that a general-purpose computing system is a device for executing programs • Recall that a program is a sequence of instructions that specify operations that are to be performed on data • Explain the difference between a general-purpose computing system and a purpose-built device • Describe the function of the hardware components used in computing systems • Explain what binary digits (bits) are, in terms of familiar symbols such as digits or letters • Measure the size or length of a sequence of bits as the number of binary digits that it contains • Describe how natural numbers are represented as sequences of binary digits • Convert a decimal number to binary and vice versa • Convert between different units and multiples of representation size • Provide examples of the different ways that binary digits are physically represented in digital devices, including electricity, magnetism, light, and even holes in paper 	End of unit summative assessment
Michaelmas 2 / Trinity 1	<p>Artificial Intelligence / Machine Learning</p> <p>What is meant by artificial intelligence and machine learning.</p> <p>The three major machine learning paradigms</p> <p>How machine learning can be used to create applications.</p>	<ul style="list-style-type: none"> • Describe the difference between ‘data-driven’ and ‘rule-based’ approaches to application development • Name examples of AI applications • Outline some benefits and issues of using AI applications • Define machine learning’s relationship to artificial intelligence • Name the three common approaches to machine learning • Describe how classification can be solved using supervised learning • Describe the impact of data on the accuracy of a machine learning(ML) model 	End of unit summative assessment
Lent 1 / Trinity 2	<p>Python Programming</p> <p>How to decompose a problem so that it can be solved using algorithmic approaches.</p> <p>How to convert these algorithms into computer code so that they can be automated.</p> <p>To learn and apply the basic programming constructs (sequence, selection, iteration) using the Python programming language.</p>	<ul style="list-style-type: none"> • Write simple Python programs that display messages, assign values to variables, and receive keyboard input • Locate and correct common syntax errors • Describe the semantics of assignment statements • Use simple arithmetic expressions in assignment statements to calculate values • Receive input from the keyboard and convert it to a numerical value • Use relational operators to form logical expressions • Use binary selection (if, else statements) to control the flow of program execution • Generate and use random integers • Use multi-branch selection (if, elif, else statements) to control the flow of program execution • Describe how iteration (while statements) controls the flow of program execution • Use iteration (while loops) to control the flow of program execution 	End of unit summative assessment

Examples of Homework	Opportunity for independent study on specified topics to develop greater understanding of topics covered. Problems designed to be decomposed and potentially automated via programming.	
Key terminology	Hardware, software, data representation, binary, artificial intelligence, machine learning, supervised learning, reinforcement learning, unsupervised learning, decision tree	
Super-curricular enrichment and scholarly extension	<ul style="list-style-type: none"> • Read: Computing Sharepoint Site (News Feed), MCI Resources • Watch: BBC Click, • Listen: BBC Sounds - Podcasts (Technology Section) • Visit: 3D Virtual Tour – The National Museum of Computing (tnmoc.org) 	
Useful websites	https://machinelearningforkids.co.uk/ www.gcsepod.com KS3 Computer Science - BBC Bitesize	
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